

# Flood

## A Prevention Guide to Promote Your Personal Health and Safety

Centers for Disease Control and Prevention (CDC)

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### Introduction

After a flood, the physical devastation to a community is obvious. But during the flood and its aftermath, there are some basic facts to remember that will help protect your personal health and safety. This pamphlet provides information that will help you and other flood victims prevent diseases and injury and maintain good health in the days and weeks following a flood.

This information is provided by the Centers for Disease Control and Prevention (CDC) through state and local health departments. It includes general disease and injury prevention guidelines that may vary slightly from state to state. If in doubt, contact your local or state health departments, which will issue health advisories or recommendations particular to local conditions.

### Water Quality

Listen for public announcements on the safety of the municipal water supply. Flooded, private water wells will need to be tested and disinfected after flood waters recede. Questions about testing should be directed to your local or state health departments.



## Water for Drinking and Cooking

Safe drinking water includes bottled, boiled, or treated water. Your state or local health department can make specific recommendations for boiling or treating drinking water in your area. Here are some general rules concerning water for drinking and cooking. Remember:

- Do not use contaminated water to wash dishes, brush your teeth, wash and prepare food, or make ice.
- If you use bottled water know where it came from. Otherwise, water should be boiled or treated before use. Drink only bottled, boiled, or treated water until your supply is tested and found safe.
- Boiling water kills harmful bacteria and parasites. Bringing water to a rolling boil for 1 minute will kill most organisms.
- Water may be treated with chlorine or iodine tablets, or by mixing six drops (1/8 teaspoon) of unscented, ordinary household chlorine bleach (5.25 percent sodium hypochlorite) per gallon of water. Mix the solution thoroughly, and let stand for about thirty minutes. However, this treatment will not kill parasitic organisms.

Containers for water should be rinsed with a bleach solution before reusing them. Use water storage tanks and other types of containers with caution. For example, fire truck storage tanks, as well as previously used cans or bottles may be contaminated with microbes or chemicals. Do not rely on untested devices for decontaminating water.

## Disinfecting Wells

If you suspect that your well may be contaminated, contact your local or state health department or agriculture extension agent for specific advice. Here are some general instructions for disinfecting wells.



### To Disinfect Bored or Dug Wells

1. Use Table 1 to calculate how much bleach (liquid or granules) to use.
2. To determine the exact amount to use, multiply the amount of disinfectant needed (according to the diameter of the well) by the depth of the well. For example, a well 5 feet in diameter requires 4 1/2 cups of bleach per foot of water. If the well is 30 feet deep multiply 4 1/2 by 30 to determine the total cups of bleach required ( $4 \frac{1}{2} \times 30 = 135$  cups). There are sixteen cups in each gallon of liquid bleach .
3. Add this total amount of disinfectant to about 10 gallons of water. Splash the mixture around the wall or lining of the well. Be certain the disinfectant solution contacts all parts of the well.

4. Seal the well top.
5. Open all faucets and pump water until a strong odor of bleach is noticeable at each faucet. Then stop the pump and allow the solution to remain in the well overnight.
6. The next day, operate the pump by turning on all faucets, continuing until the chlorine odor disappears. Adjust the flow of water faucets or fixtures that discharge to septic systems to a low flow to avoid overloading the disposal system.

**Table 1. Bleach for a Bored or Dug Well**

Diameter of well (in feet)	Amount of 5.25% laundry bleach chlorine per foot of water	Amount of 70% chlorine granules per foot of water
3	1 1/2 cups	1 ounce
4	3 cups	2 ounces
5	4 1/2 cups	3 ounces
6	6 cups	4 ounces
7	9 cups	6 ounces
8	12 cups	8 ounces
10	18 cups	12 ounces
<i>Source: Illinois Department of Public Health. Recommendations may vary from state to state.</i>		

### To Disinfect Drilled Wells

1. Determine the amount of water in the well by multiplying the gallons per foot by the depth of the well in feet. For example, a well with a 6-inch diameter contains 1.5 gallons of water per foot. If the well is 120 feet deep, multiply 1.5 by 120 ( $1.5 \times 120 = 180$ ).
2. For each 100 gallons of water in the well, use the amount of chlorine (liquid or granules) indicated in Table 2. Mix the total amount of liquid or granules with about 10 gallons of water.
3. Pour the solution into the top of the well before the seal is installed.
4. Connect a hose from a faucet on the discharge side of the pressure tank to the well casing top. Start the pump. Spray the water back into the well and wash the sides of the casing for at least 15 minutes.
5. Open every faucet in the system and let the water run until the smell of chlorine can be detected. Then close all the faucets and seal the top of the well.
6. Let stand for several hours, preferably overnight.
7. After you have let the water stand, operate the pump by turning on all faucets continuing until all odor of chlorine disappears. Adjust the flow of water from faucets or fixtures that discharge into septic tank systems to a low flow to avoid overloading the disposal system.

**Table 2. Bleach for a Drilled Well**

Diameter of Well (in inches)	Gallons per foot of water
3	0.37
4	0.65
5	1.0
6	1.5

8	2.6
10	4.1
12	6.0

Amount of Disinfectant Required for each 100 gallons of water	
Laundry Bleach (5.25% Chlorine)	3 cups*
Hypochloride Granules (70% Chlorine)	2 ounces**
<p>*1 cup = 8-ounce measuring cup  **1 ounce = 2 heaping tablespoons of granules</p> <p><i>Source: Illinois Department of Public Health.  Recommendations may vary from state to state.</i></p>	

## Food Safety

Do not eat any food that may have come into contact with flood water. Discard any food without a waterproof container if there is any chance that it has come into contact with flood water. Undamaged, commercially canned foods can be saved if you remove the can labels, thoroughly wash the cans, and then disinfect them with a solution consisting of one cup of bleach in 5 gallons of water. Relabel your cans, including expiration date, with a marker. Food containers with screw-caps, snap-lids, crimped caps (soda pop bottles), twist caps, flip tops, and home canned foods should be discarded if they have come into contact with flood water because they cannot be disinfected. For infants, use **only** pre-prepared canned baby formula that requires no added water, rather than powdered formulas prepared with treated water.



## Frozen and Refrigerated Foods

If your refrigerator or freezer may be without power for a long period:

- Divide your frozen foods among friends' freezers if they have electricity;
- Seek freezer space in a store, church, school, or commercial freezer that has electrical service; or
- Use dry ice -- 25 pounds of dry ice will keep a 10-cubic-foot freezer below freezing for 3-4 days. (Exercise care when handling dry ice, because it freezes everything it touches. Wear dry, heavy gloves to avoid injury.)

Thawed food can usually be eaten or refrozen if it is still "refrigerator cold," or if it still contains ice crystals. To be safe, remember, "When in doubt, throw it out." Discard any food that has been at room temperature for two hours or more, and any food that has an unusual odor, color, or texture.

Your refrigerator will keep foods cool for about 4 hours without power if it is unopened. Add block or dry ice to your refrigerator if the electricity will be off longer than 4 hours.

## Sanitation and Hygiene

It is critical for you to remember to practice basic hygiene during the emergency period. Always wash your hands with soap and water that has been boiled or disinfected:



- before preparing or eating food;
- after toilet use;
- after participating in flood cleanup activities; and
- after handling articles contaminated with flood water or sewage.

Flood waters may contain fecal material from overflowing sewage systems, and agricultural and industrial byproducts. Although skin contact with flood water does not, by itself, pose a serious health risk, there is some risk of disease from eating or drinking anything contaminated with flood water. If you have any open cuts or sores that will be exposed to flood water, keep them as clean as possible by washing well with soap to control infection. If a wound develops redness, swelling, or drainage, seek immediate medical attention.

In addition, parents need to help children avoid waterborne illness. Do not allow children to play in flood water areas, wash children's hands frequently (always before meals), and do not allow children to play with flood-water contaminated toys that have not been disinfected. You can disinfect toys using a solution of one cup of bleach in 5 gallons of water.

## Precautions When Returning to Your Home

Electrical power and natural gas or propane tanks should be shut off to avoid fire, electrocution, or explosions. Try to return to your home during the daytime so that you do not have to use any lights. Use battery-powered flashlights and lanterns, rather than candles, gas lanterns, or torches. If you smell gas or suspect a leak, turn off the main gas valve, open all windows, and leave the house immediately. Notify the gas company or the police or fire departments or State Fire Marshal's office, and do not turn on the lights or do anything that could cause a spark. Do not return to the house until you are told it is safe to do so.



Your electrical system may also be damaged. If you see frayed wiring or sparks, or if there is an odor of something burning but no visible fire, you should immediately shut off the electrical system at the circuit breaker.

Avoid any downed power lines, particularly those in water. Avoid wading in standing water, which also may contain glass or metal fragments.

You should consult your utility company about using electrical equipment, including power generators. Be

aware that it is against the law and a violation of electrical codes to connect generators to your home's electrical circuits without the approved, automatic-interrupt devices. If a generator is on line when electrical service is restored, it can become a major fire hazard. In addition, the improper connection of a generator to your home's electrical circuits may endanger line workers helping to restore power in your area. All electrical equipment and appliances must be completely dry before returning them to service. It is advisable to have a certified electrician check these items if there is any question. Also, remember not to operate any gas-powered equipment indoors.

## Cleanup

Walls, hard-surfaced floors, and many other household surfaces should be cleaned with soap and water and disinfected with a solution of 1 cup of bleach to five gallons of water. Be particularly careful to thoroughly disinfect surfaces that may come in contact with food, such as counter tops, pantry shelves, refrigerators, etc. Areas where small children play should also be carefully cleaned. Wash all linens and clothing in hot water, or dry clean them. For items that cannot be washed or dry cleaned, such as mattresses and upholstered furniture, air dry them in the sun and then spray them thoroughly with a disinfectant. Steam clean all carpeting. If there has been a backflow of sewage into the house, wear rubber boots and waterproof gloves during cleanup. Remove and discard contaminated household materials that cannot be disinfected, such as wallcoverings, cloth, rugs, and drywall.



## Immunizations

Outbreaks of communicable diseases after floods are unusual. However, the rates of diseases that were present before a flood may increase because of decreased sanitation or overcrowding among displaced persons. Increases in infectious diseases that were *not* present in the community before the flood are not usually a problem. If you receive a puncture wound or a wound contaminated with feces, soil, or saliva, have a doctor or health department determine whether a tetanus booster is necessary based on individual records.



Specific recommendations for vaccinations should be made on a case-by-case basis, or as determined by local and state health departments.

## Mosquitoes

The large amount of pooled water remaining after the flood will lead to an increase in mosquito populations. Mosquitoes are most active at sunrise and sunset. The majority of these mosquitoes will be pests, but will not carry communicable diseases. Local, state, and federal public health authorities will be actively working to control the spread of any mosquito-borne diseases.



To protect yourself from mosquitoes, use screens on dwellings, and wear long-sleeved and long-legged clothing. Insect repellents containing DEET are very effective. Be sure to read all instructions before using DEET. Care must be taken when using DEET on small children. Products containing DEET are available from retail outlets and through local and state health departments.

To control mosquito populations, drain all standing water left in containers around your home.

## Other Hazards

### Swiftly Flowing Water



If you enter swiftly flowing water, you risk drowning -- regardless of your ability to swim. Swiftly moving shallow water can be deadly, and even shallow standing water can be dangerous for small children. Cars or other vehicles do not provide adequate protection from flood waters. Cars can be swept away or may break down in moving water.

### Animals

Many wild animals have been forced from their natural habitats by flooding, and many domestic animals are also without homes after the flood. Take care to avoid these animals, because some may carry rabies. Remember, most animals are disoriented and displaced, too. Do not corner an animal. If an animal must be removed, contact your local animal control authorities. Your local and state health department can provide information about the types of wild animals that carry rabies in your area.

Rats may be a problem during and after a flood. Take care to secure all food supplies, and remove any animal carcasses in the vicinity by contacting your local animal control authorities.

If you are bitten by any animal, seek immediate medical attention. If you are bitten by a snake, first try to accurately identify the type of snake so that, if poisonous, the correct anti-venom may be administered.

### Chemical Hazards

Use extreme caution when returning to your area after a flood. Be aware of potential chemical hazards you may encounter during flood recovery. Flood waters may have buried or moved hazardous chemical containers of solvents or other industrial chemicals from their normal storage places.

If any propane tanks (whether 20-lb. tanks from a gas grill or household propane tanks) are discovered, do not attempt to move them yourself. These represent a very real danger of fire or explosion, and if any are found, police or fire departments or your State Fire Marshal's office should be contacted immediately.

Car batteries, even those in flood water, may still contain an electrical charge and should be removed with extreme caution by using insulated gloves. Avoid coming in contact with any acid that may have spilled from a damaged car battery.

## Summary

The physical devastation that accompanies a flood is enormous. But as the flood waters recede, there may be more threats to your personal health and safety. By taking some basic precautions, you can help prevent many injuries as well as the possibility of some diseases.

In the midst of all this water, remember that heat or cold can play a major role in your personal health. Drink plenty of fluids, avoid caffeine, and do not wait to get thirsty. When possible, take a break, being careful not to get any more exhausted than you already may be. Do not add weather-related health problems like heat



stress or hypothermia to your other problems.

The weeks after a flood are going to be rough. In addition to your physical health, you need to take some time to consider your mental health as well. Remember that some sleeplessness, or anxiety, anger, hyperactivity, mild depression, or lethargy are normal, and may go away with time. If you feel any of these symptoms acutely, seek some counseling. Your state and local health departments will help you find the local resources, including hospitals or health care providers, that you may need.

In addition to the information provided in this pamphlet, local and state health departments or emergency management agencies may issue health advisories particular to your location. For more information, contact your local or state health departments.

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